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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Bradford A. Ritter

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08/17/2004

HEWLETT-PACKARD COMPANY

Intellectual Property Administration

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EXAMINER

NGUYEN, KIMBINH T

ART UNIT

PAPER NUMBER

2671

8

DATE MAILED: 08/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/921,681

Applicant(s)

RITTER, BRADFORD A.

Examiner

Kimbinh T. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-51 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

1. This action is responsive to amendment filed 06/03/04.
2. Claims 1-51 are pending in the application.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-9, 11-17, 19-25, 27-44 are rejected under 35 U.S.C. 102(e) as being anticipated by Wolters (6,583,790).

The applied reference has a common Assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

Claim 1, Wolters discloses creating a parametric texture map that comprises parameters for an equation that defines a surface structure in a manner in which the appearance of the surface structure includes surface

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reflectance properties (col. 2, lines 54-59; col. 3, lines 48-67; equation 2); and rendering a digital image using parametric texture map (col. 4, lines 27-40).

Claim 2, Wolters teaches creating parametric texture map such that it models a surface reflectance function defining surface reflectance properties of surface structure (the view vector, the light source vector or the half-angle vector; col. 3, lines 48-55).

Claim 3, Wolters teaches surface reflectance properties vary in response to a light direction vector and a view direction vector (col. 3, lines 36-40; col. 4, lines 32-40).

Claims 4-6, Wolters teaches parametric texture map comprises at least four independent variables (D_u , D_v , $D_u D_v$, D_u , D_v , see equation 2, col. 3, line 65 through col. 4, line 5); parametric texture map comprises at least two independent variables for defining a light direction vector for surface (L_u , L_v ; col. 5, lines 14-21); parametric texture map comprises at least two independent variables for defining a view direction vector for surface reflectance properties (V_u and V_v ; col. 5, lines 12-19).

Claim 7, Wolters teaches parametric texture map comprises a plurality of texels (col. 4, lines 6-13) and wherein parametric texture map further comprises a plurality of coefficients for each texel, plurality of coefficients defining lighting characteristics for varying views of the respective texel (col. 4, lines 6-25).

Claim 8, Wolters teaches parametric texture map comprises at least two independent variables for defining a half-angle vector for the surface (H_u , H_v ; col. 5, lines 21-22).

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Claim 9, Wolters teaches parametric texture map comprises at least two independent variables (u,v) for defining a difference vector for surface reflectance properties (diffuse and specular contributions; col. 7, lines 14-30) .

Claim 11, Wolters teaches sampling surface reflectance data and determining at least one coefficient of the parametric texture map based at least in part on the sampled surface reflectance data (col. 4, lines 6-13).

Claim 12, Wolters teaches determining six coefficients of the parametric texture map based at least in part on the sampled surface reflectance data (A1-A6; col. 3, lines 60-65).

Claims 13-17, the rationale provided in the rejection of claims 4-6, 8 and 9 is incorporated herein.

Claim 19, the rationale provide in the rejection of claim 2 is incorporated herein. In addition, Wolters teaches a computer graphics system including a graphics processor (14) and display 20 (fig. 1).

Claims 20-24, the rationale provided in the rejection of claims 4-6, 8-10.

Claim 25, Wolters teaches the graphic processor 14 renders the surface in real-time (bilinear, trilinear interpolations; col. 6, lines 12-25).

Claim 27, Wolters discloses a texture map data structure including a function (parametric texture map) comprises a plurality of texels (col. 4, lines 6-13), function evaluating at least two independent variables for defining an illumination vector (light source vector L_u, L_v) and two independent variables for defining a view vector (v_u, V_v ; col. 5, lines 12-20).

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Claim 28, the rationale provided in the rejection of claim 2 is incorporated herein.

Claim 29, the rationale provided in the rejection of claim 7 is incorporated herein.

Claims 30 and 31, Wolters discloses calculating texel display value using the texture map data to render a 3D object by the texture map data (col. 4, lines 6-40).

Claims 32-35, the rationale provided in the rejection of claims 8, 9, 28, 30 and 31 is incorporated herein.

Claims 36 and 39, Wolters teaches using a texture map that includes a function (parametric texture map) for use in rendering a digital image having surface reflectance properties (col. 4, lines 27-40), wherein the function evaluates more than two variables directed to surface reflectance properties (four variables; see equation 2).

Claims 37, 40, the rationale provided in the rejection of claim 27 is incorporated herein.

Claims 38 and 41, Wolters teaches parametric texture map evaluates at least two independent variables for defining a half-angle vector and at least two independent variables for defining a difference vector (H_u , H_v ; col. 5, lines 21-22).

Claims 42-44, the rationale provided in the rejection of claims 36 and 38 are incorporated herein.

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Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 10, 26 and 45-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolters (6,583,790) in view of Kouadio (6,765,573).

Claims 10 and 26, Wolters does not teach BRDF; however, Kouadio teaches equation models a Bidirectional Reflectance Distribution Function (BRDF) (col. 2, lines 52-65; 3, lines 55-67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the Bidirectional Reflectance Distribution Function taught by Kouadio into the parametric texture map of Wolters for providing surface reflectance distribution function, because it would improve method for CG surface shading using a stored textured map for faster processing (col. 1, lines 14-15).

Claim 45, Wolters does not teach BRDF; however, Kouadio teaches texture map includes a BRDF for use in rendering a digital image (col. 4, lines 47-50), wherein the BRDF includes more than two variables relating to surface reflectance properties of the digital image (light vector L, view vector V and direction vector N; col. 5, lines 49-65). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the Bidirectional Reflectance Distribution Function taught by Kouadio into the

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parametric texture map of Wolters for providing surface reflectance distribution function, because using BRDF function it would implement the new approach with minor extensions to make it usable for texture map, gave better visual results and is faster than the traditional BRDF computation (col. 11, lines 36-39).

Claims 46-48, Wolters teaches more than two variables are selected from the group consisting of: variables for defining an illumination, variables for defining a view vector, variables for defining a half vector and variables for defining a difference vector (Lu, Lv, Vu, Vv, Hu, Hv; col. 5, lines 7-22).

7. Claims 49-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolters (6,583,790).

Claim 49, Wolters teaches computer executable software code (hardware, software; col. 1, lines 20-22) stored to a computer-readable medium. Wolters does not teach a computer executable software code stored to a computer-readable medium; however, Wolters teaches computer graphics system typically employs hardware, software or both to generate data values (col. 1, lines 20-22), this feature related to a computer executable software code stored to a computer-readable medium. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement a computer executable software stored in a computer-readable medium such as diskette, ROM into computer graphics system of Wolters for executing computer software code, because it would provide a system would have a lower cost and higher productivity (col. 2, lines 32-33); the software comprising: receiving at least four independent surface reflectance property variables (view vector V, light

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source vector L or half-angle vector H: Vu, Vv, Lu, Lv, Hu, Hv; col. 5, lines 7-22); using a function included in a texture map (parametric texture map; col. 4, lines 27-40) for rendering a digital image, wherein the function evaluates four independent surface reflectance property variables to render the digital image having proper surface reflectance properties (diffuse contribution, specular contribution; col. 8, lines 27-35).

Claims 50, 51, the rationale provided in the rejections of claims 43, 44 and 49 are incorporated herein.

8. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wolters (6,583,790) in view of Toh (5,537,494).

Claim 18, Wolters does not teach performing a least squares fit algorithm to the sampled surface reflectance data. However, Toh teaches a least square fitting by numerical algorithm (col. 4, line 66 through col. 5, line 5). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the least squares fit algorithm taught by Toh into a bump mapping method of Wolters's teaching for proving surface reflectance to radiance environment map, because it would provide a method of encoding image data, smoothing initial image data to suppress noise and fitting a continuous equation to image intensity profile portions (col. 3, lines 13-17).

Response to Arguments

9. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

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Claims 1-35 have been modified and new claims 36-51 have been rejected according to the amendment (see the Office Action).

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimbinh T. Nguyen whose telephone number is (703) 305-9683. The examiner can normally be reached on Monday to Thursday from 7:00 AM to 4:30 PM. The examiner can also be reached on alternate Friday from 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman, can be reached at (703) 305-9798. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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August 11, 2004

A handwritten signature in black ink, appearing to read "Kimbinh Nguyen". The signature is written in a cursive, flowing style.

Kimbinh Nguyen

Patent Examiner AU 2671